

Element for Use in an Inductive Coupler for Downhole Drilling Components

Abstract

The present invention includes an element for use in an inductive coupler in a downhole component. The element includes a plurality of ductile, generally U-shaped leaves that are electrically conductive. The leaves are less than about .0625" thick and are separated by an electrically insulating material. These leaves are aligned so as to form a generally circular trough. The invention also includes an inductive coupler for use in downhole components, the inductive coupler including an annular housing having a recess with a magnetically conductive, electrically insulating (MCEI) element disposed in the recess. The MCEI element includes a plurality of segments where each segment further includes a plurality of ductile, generally U-shaped electrically conductive leaves. Each leaf is less than about .0625" thick and separated from the otherwise adjacent leaves by electrically insulating material. The segments and leaves are aligned so as to form a generally circular trough. The inductive coupler further includes an insulated conductor disposed within the generally circular trough. A

polymer fills spaces between otherwise adjacent segments, the annular housing, insulated conductor, and further fills the circular trough.